

REMARKS

Claims 32 through 39 and 44 through 53 are currently pending in the application.

This amendment is in response to the final Office Action of March 19, 2003.

Claims 32 through 37, 39, 44 through 49 and 51 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Chan et al. (U.S. Patent 5,998,860) in view of Lin et al. (U.S. Patent 5,239,198).

Claims 32, 38, 44 and 50 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Chiu (U.S. Patent 5,243,497) in view of Lin et al. (U.S. Patent 5,239,198).

Claims 35 through 37, 39, 47 through 49 and 51 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Chiu in view of Lin et al., as applied to claims 32 and 44 above, and further in view of Chan et al.

After carefully considering the cited prior art, the rejections, and the Examiner's comments, Applicants have amended claims 32 and 44, and canceled claims 35, 37, 47 and 49. Applicants respectfully submit that the presently claimed invention as amended is clearly allowable over the cited prior art because a *prima facie* case of obviousness under 35 U.S.C. § 103 cannot be established regarding the presently claimed invention by the cited prior art.

Claims 32 through 37, 39, 44 through 49 and 51 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Chan et al. in view of Lin et al. Applicants submit that to establish a *prima facie* case of obviousness under 35 U.S.C. § 103 three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the cited prior art reference must teach or suggest all of the claim limitations. Furthermore, the suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicants' disclosure. M.P.E.P. § 2143.

Applicants respectfully submit that there is no suggestion in Chan or Lin to take the upper and lower conductive traces of Chan, the connecting vias of Lin, the chip pad-to-substrate pad connection through slots in a substrate taught by Chan and the ball grid array suggested by Lin to arrive at applicants' invention. Likewise, Lin does not teach or suggest such a combination.

Furthermore, Applicants respectfully submit that the cited prior art is nothing but a collection of the elements of Applicants' claimed and presently claimed invention by picking and choosing elements of the presently claimed and claimed invention from the two pieces of art in a hindsight reconstruction based solely upon Applicants' disclosure, not the suggestions of the cited prior art.

However, Applicants have amended claims 32 and 44 to include the element of the invention calling for "inserting a flowable, hardenable glob-top material into each of said through-slots to encapsulate wires therein, such that said glob-top material extends outwardly toward at least one edge of at least one semiconductors adjacent said slot, thereby contacting said at least one edge."

Applicants respectfully submit that the cited art does not teach or suggest all the limitations of the claims as amended to establish a *prima facie* case of obviousness under 35 U.S.C. § 103 regarding the presently claimed invention. Support for the Amendment can be found in Applicants' specification in Figures 1, 2, 5 and 11. The amendment is directed toward at least the following two situations. One is the case in which two semiconductor die are adjacent to the slot, one on either side of the slot. The other is the case in which the slot has only one adjacent die. Examples of both cases are illustrated in Figure 5. Neither Chan nor Lin teach this method of using one or more adjacent dice to confer additional mechanical strength to the glob top material as well as to the wires contained within the material. In the Office Action, on page 5, it is asserted that "as can be seen in Figure 1, Chan discloses that the glob top material is inserted to extend outwardly between the edges of at least two die proximate each side of the through slots." However, In Figure 1 of Chan, it is clear that the encapsulant over the wires does not come close to reaching the edges of the adjacent chips on either side, and thus does not benefit from the additional mechanical strength which would be provided by the contact. Furthermore, neither Chan nor Lin discloses support from a single side, as Applicants do in Figure 5. As the combination fails to teach every element of Applicants' claims 32 and 44, Applicants respectfully submit that claims 32 and 44 are allowable, as well as 33 through 37, 39, 45 through 49 and 51 as depending from allowable claims. Applicants respectfully request that the Examiner's rejection be withdrawn.

Claims 32, 38, 44 and 50 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Chiu (U.S. Patent 5,243,497) in view of Lin et al. (U.S. Patent 5,239,198). However, Applicants submit that neither reference suggests that face-downward-mounted die which are connected to the reverse of a substrate through slots in the substrate should be combined with conductive traces on the substrate surface which are interconnected by vias through the substrate. Furthermore, Applicants respectfully submit that the combination of references is improper. Chiu does teach the use of a slotted substrate and the mounting of die face-down, with attachment to bond pads or other connections on the side opposite the mounting side. However, Chiu does not teach substrate connections which are surface-connected to conductive traces. In fact, many of the connections are directly connected to inner layers of the substrate through partial vias in the surface of the substrate, not to conductive traces on the surface. Col. 2, lines 8-11. The advantage to be gained with such short and direct connections is (Col 2, line 13) “only a short bond wire is required to connect the semiconductor chip to the circuitry on the circuitboard” leading to the ability to have more dice on the board with out the slowing effects of excess wire. Modifying Chiu by adding the conductive traces of Lin over the surface of the substrate would obviate the above mentioned object and advantage of the invention. Thus Chiu teaches away from the combination.

Furthermore, one “skilled in the art” would not be tempted to make the combination, for “[i]f a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.” M.P.E.P. § 2143.01.

Additionally, as stated above in response to the rejection due to the teachings of Chan in view of Lin, claims 32 and 44 have been amended. With respect to the amended claims, Applicants respectfully submit that a *prima facie* obviousness under 35 U.S.C. § 103 has not and cannot be established regarding the presently claimed invention because the combination of Chiu with Lin fails to teach every element of Applicants’ claims. The element not taught or suggested by the combination of the cited prior art to establish a *prima facie* case of obviousness under 35 U.S.C. § 103 regarding the presently claimed invention is “inserting a flowable, hardenable glob-top material into each said through-slot to encapsulate wires therein, such that said glob-top

material is inserted to extend outwardly toward at least one edge of at least one semiconductors adjacent said slot, thereby contacting said at least one edge.” Applicants submit that claims 32 and 44 are thus allowable, with claims 38 and 50 allowable as depending from allowed claims.

Claims 35 through 37, 39, 47 through 49 and 51 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Chiu in view of Lin et al., as applied to claims 32 and 44 above, and further in view of Chan et al. Claims 35, 37, 47 and 49 have been cancelled. Applicants respectfully submit that the remaining claims are allowable as depending from allowable claims 32 and 44.

Applicants request the entry of this amendment for the following reasons:

The amendment is timely filed.

The amendment does not require any further search or consideration.

The amendment places the application in condition for allowance.

In summary, Applicants respectfully submit that claims 32 through 34, 36, 38, 39, 44 through 46, 47, 48, 50 and 51 are allowable over the cited prior art. Applicants request the allowance of these claims and the case passed for issue.

Respectfully submitted,



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